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The Synapse
The Role of Neurotransmitter,
The Neural Conduction in Synapse
(Innovated Conception)

The neural conduction must be of a great simplicity and of a great velocity as well. Therefore, in order to verify if the neural conduction through the neural synapses respects this concept, I did a simple exercise and counted the steps of such act. Surprisingly, I found them to be seven consequent steps. Henceforth, I am trying to find out another mechanism of the neural conduction through the synapses.

The Neural Conduction in Synapse
(International Hypothesis)

In the neural synapses, the action potential arrives to the presynaptic knob. It activates the voltage gated Ca^{++} channels(1). It opens the gates of these channels in order to let entering the positive Ca^{++} ions into the lumen(2). The incoming positive calcium ions in turn activate the neural vesicles(3), inside which hide the neurotransmitters. The recently activated vesicles adhere to the cell membrane of the knob. Then, they inject the neurotransmitter into the synaptic cleft(4). The neurotransmitter traverses the synaptic cleft toward the another edge(5). They adhere to the external receptors of the postsynaptic dendrite(6). The activated receptors enforce certain ions channels to open their gates and to allow the specific ions to come into the lumen of the postsynaptic dendrite(7). Finally, we get the neural conduction through the neural synapses.

The Neural Conduction in Synapse
(Innovated Personal Hypothesis)

My personal view of neural conduction via the ***Synapse*** is based on three conceptions. ***Firstly,*** the neural conduction in ***Synapse*** is electrical. ***Secondly,*** the role of the ***Neurotransmitter*** is to make the ***Synaptic Cleft*** conductive to electricity in permanent. Therefore, it is omnipresent in the ***Synaptic Cleft*** at rest as well as in action. ***Thirdly,*** the role of the ***Action Pressure Wave*** is to build up the ***Terminal Electrical Current***, and to fasten its passage through the ***Synaptic Cleft*** as well.

I illustrated my personal view of the neural conduction through the neural synapses in three figures; ***figures (1), (2), (3).*** However, I would like to clarify two essential points of my personal conception, which make all the difference vis-à-vis the international conception.

1. *The Role of the Neurotransmitter*

Permanently**,** at rest as well as in action, the neural ***vesicles*** inject their burdens of the ***neurotransmitter*** into the ***synaptic cleft***. In such a way, the ***neurotransmitter*** moistens the ***synaptic cleft***, and makes it apt to conduct the ***electrical neural current*** whenever it is time; ***figure (1)***. Therefore, promptly the ***electrical neural current*** could pass to another side of the ***synapses***; ***figure (2).*** Upon its passage, it releases the adsorbed ions and enforce them to come into the ***postsynaptic dendrite***; ***figure (3).***

2. *The Role of the Action Pressure Wave*

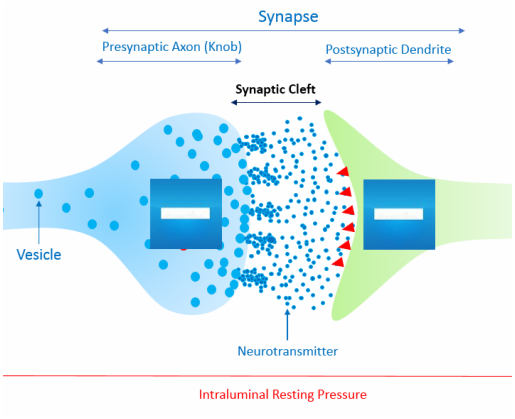
The ***Action Pressure Wave*** is an innovated term that I often utilize in my personal hypothesis of neural conduction. It is a real pressure wave. In the ***Motor Neuron***, the ***Action Pressure Wave*** is built up at the ***Axon Hillock***. In the ***Sensory Neuron***, it is built up at the root of ***dendrite***.

The ***Action Pressure Wave*** consists of ***crest*** and ***trough***. The ***crest*** is of positive pressure, while the ***trough*** is of negative pressure. Coming soon after the crest, the ***wave's trough*** is the essential factor in the generating of the ***Electrical Neural Current***.

However, the ***wave's crest*** does fasten the passage of the current through the synapse in two ways. Upon its arrival, the crest (front) of the ***Action Pressure Wave*** pushes the presynaptic edge tward the postsynaptic edge. Therefore, the two edges of the synaptic cleft become favorably closer to each other. Moreover, the wave's crest pushes the vesicles against the cell membrane of knob, and forces them to inject all their burdens of neurotransmitter inside the synaptic claeft; ***figure (2).***

Upon its arrival in the presynaptic ***knob***, the negative pressure of the ***trough*** opens the ***pressure gated Ca^{++} channels***, and invites the positive ***Ca^{++}*** to come into the lumen at the same time. Hence after, the cathode of the electrical current is quite present; ***figure (3)***.

To view a film that explains my personal conception of neural conduction in synapse, click on this link.



Figure(1)

The Neural Synapse (at rest)

The synapse consists of the presynaptic axon (Knob), and the postsynaptic effector organ (Postsynaptic Dendrite). The synaptic cleft separates the two parties from each other. The synaptic cleft is unconductive empty space per se. However, at rest as well as in action, the neurotransmitter fills the synaptic cleft. Henc, the synaptic cleft becomes conductive to electricity, and therefore ready to pass the neural electrical current to the another edge at any time.

Moreover, for the ultimate function of the neural synapse itself, the neurotransmitter adsorbs certaine ion(s) (small triangles). They are positive ions (Na^+ , Ca^{++},..) in the excitatory synapses, and are negative ions (Cl^- ,..) in the inhibitory synapses.

N.B. the cytoplasm of two parties of synapse are negatively charged at rest, principally due to the intracellular proteins.

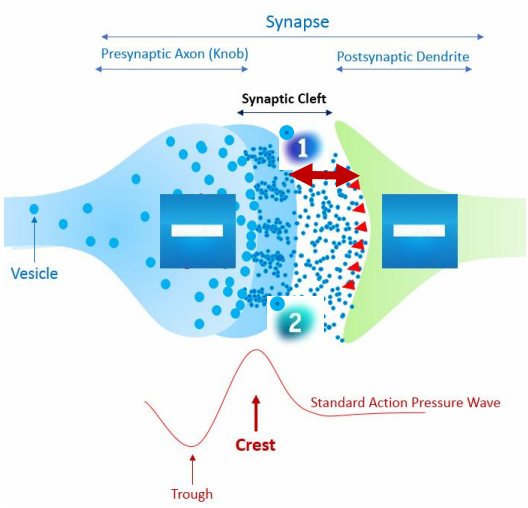


Figure (2)

The Neural Synapses in action (Role of Wave's Crest)

Udner the influence of the positive pressure of its crest, the action pressure wave pushes the presynaptic edge tward the postsynaptic edge. Therefore, the two edges of the synaptic cleft become favorably closer to each other (**1**). Moreover, the wave's crest pushes the vesicles against the cell membrane of knob, and forces them to inject all their burdens of neurotransmitter inside the synaptic claeft (**2**).

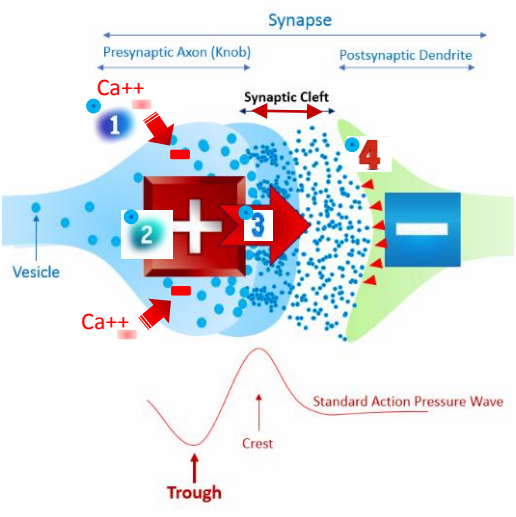


Figure (3)

The Neural Synapse in action (Role of Wave's Trough)

In turn, the negative pressure of the wave's trough opens the gates of the pressure-gated Ca^{++} channels, and invites the Ca^{++} to come into the lumen of the knob (**1**). The positive ions (Ca^{++}) will positively charge the knob, and make it the cathode of the future electrical neural current (**2**). The anode of the electrical current is already present, represented by the negatively charged postsynaptic dendrite. Moreover, the in-between conductive intermediate is henceforth available thanks to the neurotransmitter that fills the synaptic cleft in permanent. From the recently charged positive presynaptic knob (the cathode) to the instinctively charged negative postsynaptic dendrite (the anode), the electrical neural current could hence freely pass (**3**).

Upon its passge through the synaptic cleft, the electrical neural current releases the adsorbed ions (the small triangles), and enforces them to come into the postsynaptic dendrite (**4**). The incoming ions could be the positive ions (Ca++, Na^{+},..) in the excitatory neural synapses, and should be the negative ions (Cl^{-},..) in the inhibitatoy synapses.

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In the same context, one could read:

The Neural Conduction (Innovated Conception)

Neural Conduction in Neural Fiber (PowerPoint Presentation)

The Sensory Receptors, The Genius of Creation and the Beauty of Creature (Innovated Conception)

The Neural Conduction in the Synapses (Innovated Conception)

The Neural Conduction in Synapses (PowerPoint Presentation)

The Node of Ranvier, the Equalizer (Innovated Conception)

The Node of Ranvier, the Equalizer (PowerPoint Presentation)

The Philosophy of Pain, Pain Comes First (Innovated Conception)

The Philosophy of Form, (Innovated Conception)

The Spinal Injury, the Pathology of the Spinal Shock, the Pathology of the Hyperreflexia (Innovated Conception)

The Nerve Conduction Study, The Wrong Hypothesis is the Origin of the Misinterpretations (Innovated Conception)

The Wallerian Degeneration, Attacks the Motor Axons of Peripheral Nerve, while Conserves its Sensory Axons(Innovated Conception)

Barr Body, A Mystery in the Origin & Ignorance in the Function (Innovated)

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